UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,826	01/21/2004	Lai Wa Helen Chan	P/4076-65	6092

2352 7590 07/27/2005

OSTROLENK FABER GERB & SOFFEN
1180 AVENUE OF THE AMERICAS
NEW YORK, NY 100368403

EXAMINER	
KOCH, GEORGE R	

ART UNIT	PAPER NUMBER
1734	

DATE MAILED: 07/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/762,826	CHAN ET AL.	
	Examiner	Art Unit	
	George R. Koch III	1734	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) *14-23* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 2, 12 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Namerikawa '423 (US 6,523,423 B1).

As to claim 1, Namerikawa '423 discloses a force sensor capable of being used as an apparatus for aligning a bonding tool, the force sensor comprising a plurality of force sensing sections (see columns 6-11, which discuss distributions of stress), each section being capable of individually detecting an amount of force from a part of a bonding tool acting on that sensing section.

This force sensor is considered to be capable being used to generate an alignment signal for adjusting the orientation of a bonding tool.

As to claim 2, Namerikawa '423 discloses a collection of piezoelectric ceramic material (see column 6, lines 40-54 and column 14, lines 26-37) contained in each sensing section for piezoelectrically detecting the force exerted on that sensing section.

As to claim 12, Namerikawa '423 discloses that the force sensor comprises a ring with a hollow center (see Figure 1a).

As to claim 13, Namerikawa '423 discloses that each sensing area is of substantially equally size (see Figure 1a).

3. Claims 1-4, 12 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Namerikawa '555 (US 6,347,555 B1).

As to claim 1, Namerikawa '555 discloses a force sensor capable of being used as an apparatus for aligning a bonding tool, the force sensor comprising a plurality of force sensing sections (see Figure 1), each section being capable of individually detecting an amount of force from a part of a bonding tool acting on that sensing section.

This force sensor is considered to be capable being used to generate an alignment signal for adjusting the orientation of a bonding tool.

As to claim 2, Namerikawa '555 discloses a collection of piezoelectric ceramic material (see column 5, lines 6-14) contained in each sensing section for piezoelectrically detecting the force exerted on that sensing section.

As to claim 3, Namerikawa '555 discloses transmitting material (electrodes 40) comprising a plurality of individual electrical conductors coupled to the force sensor such that the positions of the electrical conductions coincide with the positions of the force sensing sections (see Figures 1, 7 and 8 and column 9-10, the description of Example 1) and channel current produced by each respective sensing section to a respective output terminal (see connection to item 44, Figure 11, and column 9).

As to claim 4, Namerikawa '555 discloses that the transmitting material is coupled to an electronic circuit (see item 44 and column 9) to which the output terminals are connect for measuring the current produced by each sensing section.

As to claim 12, Namerikawa '555 discloses that the force sensor comprises a ring with a hollow center (see Figure 1).

As to claim 13, Namerikawa '555 discloses that each sensing area is of substantially equally size (see Figure 1).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-5 and 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato (US 5,985,064) in view of either of Namerikawa '423 or Namerikawa '555.

Sato discloses an apparatus for aligning a bonding tool, comprising a force sensor (load sensor 33, see Figure 1, and column 3, line 66 to column 4, line 30) configured to measure a force generated by the bonding tool (Figure 1, entire picture)

on the force sensor. The control of the pressing force of the die is considered to meet the limitation of generating an alignment signal for adjusting the orientation.

Sato does not suggest that the force sensor comprises a plurality of force sensing sections, each sensing section being adapted to individually detect an amount of force from a part of the bonding tool acting on that sensing section.

Both Namerikawa '423 and Namerikawa '555 disclose a force sensor capable of being used as an apparatus for aligning a bonding tool, the force sensor comprising a plurality of force sensing sections (see Figures 1, 7 and 8 of '555 and column 6-11 of '423), each section being capable of individually detecting an amount of force from a part of force generating element acting on that sensing section. One in the art would immediately appreciate that such a sensor would provide finer feedback and bonding control. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the sensors of Namerikawa '423 or '555 in order to achieve greater bonding control.

As to claim 2, Namerikawa '423 and '555 as incorporated discloses a collection of piezoelectric ceramic material (see citations abouve) contained in each sensing section for piezoelectrically detecting the force exerted on that sensing section.

As to claim 3, Namerikawa '555 as incorporated discloses transmitting material (electrodes 40) comprising a plurality of individual electrical conductors coupled to the force sensor such that the positions of the electrical conductions coincide with the positions of the force sensing sections (see Figures 1, 7 and 8 and column 9-10, the description of Example 1) and channel current produced by each respective sensing

section to a respective output terminal (see connection to item 44, Figure 11, and column 9).

As to claim 4, Namerikawa '555 as incorporated discloses that the transmitting material is coupled to an electronic circuit (see item 44 and column 9) to which the output terminals are connect for measuring the current produced by each sensing section.

As to claim 5, none of the references disclose that the polyimide film is the transmitting material. However, official notice is taken that polyimide films are well known and conventional circuitry materials in sensor applications. Polyimide films provide easy sensor manufacturing properties and weight properties, improving sensor performance. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize such materials in order to achieve improved size, weight and performance in the sensor.

As to claim 8, Sato discloses that the force sensor (or load sensor) is couple to the bonding tool (see Figure 1).

As to claim 9, Sato as modified by the load sensors of Namerikawa '423 or '555 discloses that the bonding tool includes a collet assembly (for example, items 2, 3, 7, 8, 10, 20, 30 and 35) and the force sensor (item 33) is coupled to the collet assembly (as shown in Figure 1) whereby each sensing section is adapted to detect a reaction force action on a part of the collet assembly upon application of a force by the bonding tool on a bonding surface (and see column 4; lines 15-31).

As to claim 10, Sato discloses that the load or force sensor should be coupled to the collet assembly axially opposite a port between the collet assembly and the bonding surface (see Figure 1).

As to claim 11, the weight of the assembly exerts a pre-load force on the force sensor.

As to claim 12, Namerikawa '555 as incorporated discloses that the force sensor comprises a ring with a hollow center (see Figure 1).

As to claim 13, Namerikawa '555 as incorporated discloses that each sensing area is of substantially equally size (see Figure 1).

7. Claims 1-7 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani (JP 2000-369072) in view of either of Namerikawa '423 or Namerikawa '555.

Mizutani discloses an apparatus for aligning a bonding tool, comprising a force sensor (load sensor 25, see Figure 1) configured to measure a force generated by the bonding tool (Figure 1, entire picture) on the force sensor. The alignment of the perpendicularity of the die is considered to meet the limitation of generating an alignment signal for adjusting the orientation.

Mizutani does not suggest that the force sensor comprises a plurality of force sensing sections, each sensing section being adapted to individually detect an amount of force from a part of the bonding tool acting on that sensing section.

Both Namerikawa '423 and Namerikawa '555 disclose a force sensor capable of being used as an apparatus for aligning a bonding tool, the force sensor comprising a plurality of force sensing sections (see Figures 1, 7 and 8 of '555 and column 6-11 of '423), each section being capable of individually detecting an amount of force from a part of force generating element acting on that sensing section. One in the art would immediately appreciate that such a sensor would provide finer feedback and bonding control. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the sensors of Namerikawa '423 or '555 in order to achieve greater bonding control.

As to claim 2, Namerikawa '423 and '555 as incorporated discloses a collection of piezoelectric ceramic material (see citations abouve) contained in each sensing section for piezoelectrically detecting the force exerted on that sensing section.

As to claim 3, Namerikawa '555 as incorporated discloses transmitting material (electrodes 40) comprising a plurality of individual electrical conductors coupled to the force sensor such that the positions of the electrical conductions coincide with the positions of the force sensing sections (see Figures 1, 7 and 8 and column 9-10, the description of Example 1) and channel current produced by each respective sensing section to a respective output terminal (see connection to item 44, Figure 11, and column 9).

As to claim 4, Namerikawa '555 as incorporated discloses that the transmitting material is coupled to an electronic circuit (see item 44 and column 9) to which the

output terminals are connect for measuring the current produced by each sensing section.

As to claim 5, none of the references disclose that the polyimide film is the transmitting material. However, official notice is taken that polyimide films are well known and conventional circuitry materials in sensor applications. Polyimide films provide easy sensor manufacturing properties and weight properties, improving sensor performance. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to utilize such materials in order to achieve improved size, weight and performance in the sensor.

As to claim 6, Mizutani discloses that the force sensor is located at an alignment station (i.e., the lower portion, see Figure 1) spaced from the bonding tool, and the bonding tool (item 27, chip holder) is positionable onto the alignment station for alignment (and paragraph 0021, for example).

As to claim 7, the weight of the alignment stage functions as a biasing member to exert a preload force on the force sensor.

As to claim 12, Namerikawa '555 as incorporated discloses that the force sensor comprises a ring with a hollow center (see Figure 1).

As to claim 13, Namerikawa '555 as incorporated discloses that each sensing area is of substantially equally size (see Figure 1).

Response to Arguments

8. Applicant's arguments filed 4/22/2005 have been fully considered but they are not persuasive. With regard to claim 1 as rejected under Namerikawa, the bonding tool is not considered to be part of the apparatus as it is merely claimed as something the force sensor is used with.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to George R. Koch III whose telephone number is (571) 272-1230 (TDD only). If the applicant cannot make a direct TDD-to-TDD call, the applicant can communicate by calling the Federal Relay Service at 1-866-377-8642 and giving the operator the above TDD number. The examiner can normally be reached on M-Th 10-7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Fiorilla can be reached on (571) 272-1187. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

George R. Koch III
Patent Examiner
Art Unit 1734

GRK
1/17/2005